

REMARKS

Regarding the Status of the Claims:

Claims 1 – 46 are pending.

Claim 1 is amended to recite an embodiment supported by Fig. 1 wherein the central and perimeter portions of the upper die act as a single component and the central and perimeter regions of the lower die act as a single component.

Amended Claim 6 recites the pressurized fluid comprises a member selected from the group consisting of a lacquer, a polymer, an electrolyte, a glass, a salt, and combinations thereof, and a layer of the pressurized fluid is deposited onto the metal plate while pressing the first surface of the metal plate onto the recessed sections. It is submitted this is supported in the specification on page 7, lines 7-10.

Claim 7 has been rewritten in independent form, including all the language of claim 1, from which it formerly depended.

Claim 19 is amended as supported in the specification on page 7, lines 21 – 22.

Claim 25 has been amended to depend from claim 7, and to recite transferring the coating from the membrane to the metal plate. The amendment to claim 25 finds support in the specification on page 3, lines 16 – 22.

Amended Claim 31 recites the plate has a repeating pattern of projecting sections projecting above a base plane and between the projecting sections are portions of the plate on the base plane and the plate perimeter is on the base plane. This is supported by the plate resulting from operation of the apparatus of Fig. 1.

New Claim 39 recites an embodiment supported by Fig. 2 wherein the die having the projecting sections has a central region and a perimeter region that can move independently. It also includes features taken from Claim 6 as it was prior to the present Amendment.

Claim 39 also recites after sealing the perimeter about the cavity but prior to contacting the plate with the plurality of recessed sections, the lower surface of the plate is pressurized to cause it to bulge to form a preliminary elongation towards the die with the plurality of recessed sections. This is supported at page 6, lines 16, 17 of the present application which says: "... with the result that the plate 1 will undergo

preliminary elongation...". In the corresponding published US application this feature can be found in paragraph [0037].

Thus, the plate is submitted to a preliminary pressure on the second surface by the pressurized fluid to elongate the plate. Only after the plate has been elongated resulting in the preliminary elongation, for example, a convex form as recited in claim 40, is the first die lowered after which the final pressure is applied by means of the pressurized fluid. By first elongating the plate it will be easier to have the plate follow the shape of the recessed sections when applying the final pressure. See also on page 6 of the present application the description of fig. 2.

Claim 40 recites after sealing the perimeter about the cavity but prior to contacting the plate with the plurality of recesses, pressurizing the lower surface of the plate to cause it to bulge as a single convex form towards the die with the plurality of recesses. This is supported at page 6, line 17.

Claim 41 is amended Claim 6 dependent on Claim 39.

Claim 42 is supported by the embodiment of Fig. 2. It is respectfully submitted the die 2 of Fig. 2 stays above the initial plane of plate 1. Fig. 2 shows clamping die 9 and the upper leg of lower die 5 have the same thickness so there is no room to push die 2 of Fig. 2 below the initial plane of plate 1. Thus, if the first die would be lowered below the level of the clamped plate then the plate would simply be cut off from the clamped portion of the plate. This is also consistent with the operation of Fig. 1 in which the upper die central portion does not pass below the initial plane of the plate.

Claim 43 is Claim 7 dependent on Claim 39.

Claim 44 is original Claim 7 in independent form.

Claims 45 and 46 recite the membrane is a polymer electrolyte membrane. It is submitted this is supported by taking together disclosure at page 1, line 9 and page 7, lines 4-10.

I. Claim 25 is rejected under 35 U.S.C. §112, second paragraph.

The Office action asserts claim 25 does not identify whether the coating is transferred from the membrane to the metal plate, or whether the membrane inherently

provides coating materials to the plate because of its proximity to the plate. Claim 25 is amended to be clearer. The application at page 7, lines 4-10 states the membrane is provided with a coating to simultaneously coat the metal plate or it is possible to select a lacquer, a polymer, an electrolyte, glass or a salt as the hydraulic fluid.

Thus, for the membrane embodiment, when the coated membrane is pressed against the plate, one side of the membrane (having the transferrable coating) contacts the membrane and the opposed side of the membrane contacts the plate. In this embodiment the coating is at least partly transferred from the membrane to the plate by way of the pressure with which it is pressed against the plate.

The other embodiment makes no use of a membrane but employs a suitable liquid as hydraulic fluid which, after forming the plate, leaves a coating layer on the plate. This is now reflected in amended claim 6 and new claim 41.

II. Claims 1 – 6, 8 – 10, 12 – 24, 26, and 30 – 38 are rejected under 35 U.S.C. §102(b) over US 2001/0023603 by Yoshioka et al. (hereinafter, "Yoshioka")

A. Claim 1 and its dependent claims

Yoshioka teaches a hydraulic press machine with a female upper die and a male lower die (paragraph 16) or another embodiment with a female upper die and a blank lower die (Fig. 7). The resulting plate is useful, for example, as a separator in fuel batteries (paragraph 2).

The Office action relies on Yoshioka, Fig. 7. However, as explained by Yoshioka at paragraph 13, Figs. 7 and 8(a), 8(b) to 10(a), 10(b) illustrate a manufacturing process of the sheet metal in use of the hydraulic press machine shown in Fig. 6. In this process the sheet metal is pushed closer to the lower die while deforming into the upper die. Thus, Yoshioka pushes the plate below its initial plane. Moreover, the perimeter sections of Yoshioka are of different width and the first die 22 has rounded corners, both features enabling the forming of an upstanding edge. The perimeter sections and the dies used in the method according to the invention do not have these features. With the present method the dies are not pressed against each other and therefore there is no need to have complementary dies as with Yoshioka.

Claim 1 distinguishes over Yoshioka by reciting a first surface of the first die, facing the first surface of the plate, having a first central section and a first perimeter section, the first central section having recessed sections, and the first perimeter section forming a perimeter about the first central section, the first die having a single component for defining both the first central section and the first perimeter section.

New independent Claim 39 distinguishes over Yoshioka by reciting the plate is submitted to a preliminary pressure on the second surface by means of the pressurized fluid as a result of which the plate undergoes preliminary elongation. Only after the plate has been elongated resulting in a bulge as a preliminary elongation, for example, a convex form as recited in claim 40, is the first die lowered after which the final pressure is applied by means of the pressurized fluid. By first elongating the plate it will be easier to have the plate follow the shape of the recessed sections when applying the final pressure. See also on page 6 of the present application the description of fig. 2. This preliminary elongation of the plate is not known from Yoshioka.

Claim 40 further distinguishes over Yoshioka by reciting initially pressurizing to form a single convex surface. With the embodiment of present Fig. 2, giving the clamped plate a bit of extra space enables giving the plate an initial convex elongation before pressing the plate to its final shape.

Claim 41 further distinguishes over Yoshioka by reciting the pressurized fluid comprises a member selected from the group consisting of a lacquer, a polymer, an electrolyte, a glass, a salt, and combinations thereof, and wherein a layer of the pressurized fluid is deposited onto the metal plate during the pressing step

Claim 42 further distinguishes over Yoshioka by reciting first and second surfaces of the plate are respectively not closer to the second central section of the second die than the respective single plane while forming the projecting sections. As seen in Yoshioka Fig. 8a the plate is moved closer to the lower die.

Claim 43 recites a membrane of Claim 7 to further distinguish over the reference.

B. Product Claims 19-20

With respect to independent claim 19, it is respectfully submitted paragraph

[0015] of Yoshioka only describes a number of spaced cylindrical projections. Yoshioka does not disclose the limitation included in amended claim 19, “wherein the substantially repeating pattern is a serpentine pattern having semicircular transitions and a plurality of parallel sections.”

C. Product Claims 31-38

Amended Claim 31 recites the plate has a repeating pattern of projecting sections projecting above a base plane and between the projecting sections are portions of the plate on the base plane and the plate perimeter is on the base plane. This feature ties into a process where the moving die does not move the plate below its initial plane.

In contrast, Yoshioka, paragraph 24 explains the upper die 22 is inserted into the concavity 28d of lower die 28a until it arrives at a position slightly higher than the lower dead point. The resulting product has none of its projections, or portions between its projections, on the same plane as its perimeter.

III. Claim 7 is rejected under 35 U.S.C. §103(a) over Yoshioka and US 6,090,228 to Hwang (hereinafter, “Hwang”).

Claims 7, 43 and 44 recite the membrane, wherein claim 44 is independent. The Office action also asserts a skilled artisan would have found it obvious to coat the metal plate using the Hwang process before subjecting it to the Yoshioka forming process.

It is respectfully submitted a *prima facie* case of obviousness has not been established.

Yoshioka only discloses a method of manufacturing sheet-metal with spaced projections and does not describe placing a membrane between the metal plate and the fluid. Hwang only describes an anticorrosive treatment method and provides no apparent reason to modify the process of Yoshioka to place a membrane between the metal plate and the fluid.

Applicant respectfully submits Hwang only describes coating a pre-formed plate. There is no membrane.

Claim 45 further distinguishes over these references by reciting "polymer electrolyte membrane".

IV. Claim 25 is rejected under 35 U.S.C. §103(a) over Yoshioka, WO 2004/030118 to Kumar et al. (hereinafter, "Kumar"), and Hwang.

The Office action asserts, Kumar teaches a method of using a hydraulic press to press two layers together wherein one layer has a catalyst that transitions bonding to the other membrane layer during the press cycle.

Applicant respectfully submits the decal transfer method described on page 8 of Kumar is inapplicable in a hydroforming process. Page 8, lines 15 – 18 of Kumar explains, the entire assembly was introduced between two pre-heated plates of a hydraulic press and the plates were brought together. None of the references provide a basis for a skilled artisan to predict whether a decal could be applied using a pressurized fluid rather than a plate.

Additionally, Kumar does not describe transferring a catalyst coating to a metal plate. Instead, as described on page 8, lines 12 – 15 of Kumar, the membrane was sandwiched between two anode and cathode catalyst coated decals and care was taken to ensure that the coatings on the two decals were positioned facing the membrane. Furthermore, Kumar at page 8, lines 20 – 23 explains, the assembly was removed from the press and the films were peeled off from the top of the membrane "showing that the catalyst coating had been transferred to the membrane." Thus, Kumar provides no apparent reason to transfer a coating from a membrane to a metal plate.

New Claim 46 further distinguishes over the references by reciting "polymer electrolyte membrane".

V. Claim 26 is rejected under 35 U.S.C. §103(a) over Yoshioka, and US 2003/0064278 to Matsukawa (hereinafter, "Matsukawa")

Applicant submits Matsukawa does not compensate for the shortcomings discussed above, with respect to Yoshioka.

VI. Claims 11 and 29 are rejected under 35 U.S.C. §103(a) over Yoshioka, and US 2002/0127131 to Katsuki et al. (hereinafter, "Katsuki")

Applicant submits Katsuki does not compensate for the shortcomings discussed above, with respect to Yoshioka.

VII. Claims 11 and 28 are rejected under 35 U.S.C. §103(a) over Yoshioka, and Katsuki et al. (US 2002/0113064) (sic Watanabe)

Applicant submits US 2002/0113064 to Watanabe does not compensate for the shortcomings discussed above, with respect to Yoshioka.

VIII. Claim 27 is rejected under 35 U.S.C. §103(a) over Yoshioka and WO 02/103073 to Masayoshi (sic Suehiro)

Applicant submits WO 02/103073 to Suehiro does not compensate for the shortcomings discussed above, with respect to Yoshioka.

IX. In Conclusion:

The present application is in condition for allowance. Applicants request favorable action in this matter. In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner is welcome to contact the undersigned by phone to further the discussion.

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Date: Saturday, March 14, 2009
Attorney Docket No. 8459.011.US0000
APV/bms

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